Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference FP20030508	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/JP2003/007787	International filing date (*day/month/year*) 19 June 2003 (19.06.2003)	Priority date (*day/month/year*) 21 June 2002 (21.06.2002)
International Patent Classification (IPC) or national classification and IPC B01J 38/48		
Applicant THE CHUGOKU ELECTRIC POWER CO.,INC.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
19 June 2003 (19.06.2003)	08 December 2003 (08.12.2003)
Name and mailing address of the IPEA/JP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/JP2003/007787

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:

pages 1-15, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages 3, 5, 8-15, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages 1, 2, 5-7, filed with the letter of 07 November 2003 (07.11.2003)

☒ the drawings:

pages 1-8, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIM[illegible]RY EXAMINATION REPORT

Internat[illegible]pplication No.
PCT/JP 03/07787

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-15	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-15	NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims		NO

2. Citations and explanations

Document 1: US 6241826 B1 (SAS Sonderabfallservice GmbH), 5 June 2001

Document 2: JP 59-62350 A (Mitsubishi Heavy Industries, Ltd.), 9 April 1984

Document 3: JP 53-125964 A (Nippon Steel Corp.), 2 November 1978

Document 4: JP 52-27091 A (Kobe Steel, Ltd.), 1 March 1977

The invention described in claims 1 to 15 does not involve an inventive step in the light of documents 1 to 3 cited in the international search report.

Document 1 (claims 1, 4, 9, and 12, embodiment 1) discloses a NO_x removal catalyst regeneration method characterized in that a NO_x removal catalyst is immersed in room temperature regeneration water containing substantially no chlorine or cleaning component, and then the NO_x removal catalyst is removed and the water drained off, and also discloses a feature of the regeneration method wherein the NO_x removal catalyst is rinsed with water after being removed from immersion. In consideration of the immersion time indicated in document 1, a feature wherein the NO_x removal catalyst is removed from the

regeneration water after completion of an immersion step performed until all foaming has finished is recognized as also being a feature of the invention disclosed in document 1.

Document 1 does not indicate how the regeneration water is treated after use, but the appropriate treatment of waste water according to its degree of contamination is nothing more than a feature fittingly determined according to need at the discretion of a person skilled in the art, and thus, a person skilled in the art could easily conceive of adapting the invention disclosed in document 1, wherein no heavy metals are dissolved into the regeneration water as a result of using the regeneration water, which is the same as the invention described in claims 1 to 4, by adding a step wherein regeneration water is treated at a conventional waste water treatment facility, thereby deriving the invention described in claims 1 to 4.

Further, an ultrasound treatment is required in the invention disclosed in document 1, but the invention described in claims 1 to 4 does not exclude the carrying out of an ultrasound treatment. Moreover, document 1 discloses a feature wherein a regeneration step during which an ultrasound treatment is not carried out is provided before a regeneration step during which an ultrasound treatment is carried out (see embodiment 1).

The feature described in claims 5 to 8, wherein the same regeneration water is repeatedly used a plurality of times, is not disclosed in document 1, but the repeated use of the same regeneration water not just once but a plurality of times is nothing more than a feature fittingly determined according to need at the discretion of a person skilled in the art, and thus, a person skilled in the art could easily conceive of deriving the invention

described in claims 5 to 8 from the invention disclosed in document 1.

The feature described in claim 9, wherein a regenerated NO_x removal catalyst is installed in a NO_x removal device without being dried, is not disclosed in document 1, but as disclosed in document 2 (claims), it is conventionally known in the art that drying can be carried out inside a NO_x removal device, and thus, a person skilled in the art could easily conceive of adapting the invention disclosed in document 1 by applying the known means disclosed in document 2 as a means for drying the catalyst, thereby deriving the invention described in claim 9.

The feature described in claims 10 and 11, wherein a regenerated NO_x removal catalyst is installed in a NO_x removal device after its catalytic performance is checked, is not disclosed in document 1, but checking catalytic performance by way of precaution before installing a NO_x removal catalyst into a NO_x removal device is nothing more than a feature fittingly determined according to need at the discretion of a person skilled in the art, and thus, a person skilled in the art could easily conceive of adding such a step to the inventions disclosed in document 1 and 2, thereby deriving the invention described in claims 10 and 11.

The feature described in claims 12 to 15, wherein a regenerated NO_x removal catalyst is installed into a NO_x removal device in a reverse direction so that the direction in which exhaust gas flows through is reversed, is not disclosed in document 1, but as disclosed in document 3 (claims, page 2, lower left column, lines 17 to 20), making the degree of deterioration uniform by

reversing a NO_x removal catalyst and then installing it is conventionally practiced in the art, and thus, in the light of the obvious problem of preventing deterioration of the catalyst, a person skilled in the art could easily conceive of adding the step disclosed in document 3 to the inventions disclosed in documents 1 and 2, thereby deriving the invention described in claims 12 to 15.

The invention described in claims 1 to 15 does not involve an inventive step in the light of documents 1 to 4 cited in the international search report.

Document 4 (embodiment 1) discloses a NO_x removal catalyst regeneration method characterized in that a NO_x removal catalyst is immersed in room temperature regeneration water, and then the NO_x removal catalyst is removed and the water drained off. In consideration of the immersion time indicated in document 4, a feature wherein the NO_x removal catalyst is removed from the regeneration water after completion of an immersion step performed until all foaming has finished is recognized as also being a feature of the invention disclosed in document 4.

Document 4 does not disclose a feature wherein the regeneration water contains substantially no chlorine (first point of difference), nor does it indicate how the regeneration water is treated after use (second point of difference).

Considering the first point of difference, document 1 (embodiment 1) indicates that the use of distilled water as regeneration water is preferable in terms of ionic absorption, and a person skilled in the art could easily conceive of applying distilled water, described in document 1 as a preferred regeneration water, to the invention disclosed in document 4. The second point of difference has already been considered in the discussion

pertaining to documents 1 to 3.

In the light of the above, a person skilled in the art could easily conceive of deriving the invention described in claims 1 to 4 from the inventions disclosed in documents 1 and 4.

Moreover, a feature wherein a NO_x removal catalyst is rinsed after being removed from immersion is disclosed in document 1.

As already considered in the discussion pertaining to documents 1 to 3, a person skilled in the art could easily conceive of the invention described in claims 5 to 15 from the inventions disclosed in documents 1 to 4.

ART 34 AMDT

Claims

1. (Amended) A method for regenerating an NO_x removal catalyst employed in a flue gas NO_x removal apparatus, characterized in that the method comprises a regeneration step including immersing the NO_x removal catalyst at ambient temperature in regeneration water containing substantially no chlorine and no cleaning component; removing the catalyst from the regeneration water; and removing water from the catalyst and a treatment step including treating the regeneration water which has been employed in the regeneration step in an ordinary wastewater treatment facility without performing a heavy metal treatment step.

2. (Amended) A method for regenerating an NO_x removal catalyst according to claim 1, wherein the NO_x removal catalyst is immersed in regeneration water until bubbling stops and, subsequently, removed from the regeneration water.

3. A method for regenerating an NO_x removal catalyst according to claim 1, wherein the NO_x removal catalyst removed from the regeneration water is washed with water.

4. A method for regenerating an NO_x removal catalyst according to claim 2, wherein the NO_x removal catalyst removed from the regeneration water is washed with water.

5. (Amended) A method for regenerating an NO_x removal catalyst according to claim 1, wherein the regeneration water which has been used in the regeneration step is treated in

the treatment step after it is repeatedly used, without undergoing any treatment, a plurality of times in a regeneration step for regenerating another NO_x removal catalyst.

6. (Amended) A method for regenerating an NO_x removal catalyst according to claim 2, wherein the regeneration water in which the NO_x removal catalyst is immersed is treated in the treatment step after it is repeatedly used, without undergoing any treatment, a plurality of times.

7. (Amended) A method for regenerating an NO_x removal catalyst according to claim 3, wherein the regeneration water in which the NO_x removal catalyst is immersed is treated in the treatment step after it is repeatedly used, without undergoing any treatment, a plurality of times.

8. A method for regenerating an NO_x removal catalyst according to claim 4, wherein the regeneration water in which the NO_x removal catalyst has been immersed is repeatedly used a plurality of times.

9. A method for regenerating an NO_x removal catalyst according to any of claims 1 to 8, wherein the NO_x removal catalyst having been regenerated is installed in the flue gas NO_x removal apparatus without drying the catalyst before installation.

10. A method for regenerating an NO_x removal catalyst according to any of claims 1 to 8, wherein the NO_x removal catalyst having been regenerated is installed in the flue gas NO_x removal apparatus after catalytic performance of the

regenerated NO_x removal catalyst is assessed.

11. A method for regenerating an NO_x removal catalyst according to claim 9, wherein the NO_x removal catalyst having been regenerated is installed in the flue gas NO_x removal apparatus after catalytic performance of the regenerated NO_x removal catalyst is assessed.

12. A method for regenerating an NO_x removal catalyst according to any of claims 1 to 8, wherein the regenerated NO_x removal catalyst is installed in the flue gas NO_x removal apparatus such that the catalyst is inverted with respect to the direction of the flow of discharge gas.

13. A method for regenerating an NO_x removal catalyst according to claim 9, wherein the regenerated NO_x removal catalyst is installed in the flue gas NO_x removal apparatus such that the catalyst is inverted with respect to the direction of the flow of discharge gas.

14. A method for regenerating an NO_x removal catalyst according to claim 10, wherein the regenerated NO_x removal catalyst is installed in the flue gas NO_x removal apparatus such that the catalyst is inverted with respect to the direction of the flow of discharge gas.

15. A method for regenerating an NO_x removal catalyst according to claim 11, wherein the regenerated NO_x removal catalyst is installed in the flue gas NO_x removal apparatus such that the catalyst is inverted with respect to the direction of the flow of discharge gas.